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Psychology Unit *Gaetano Kanizsa*

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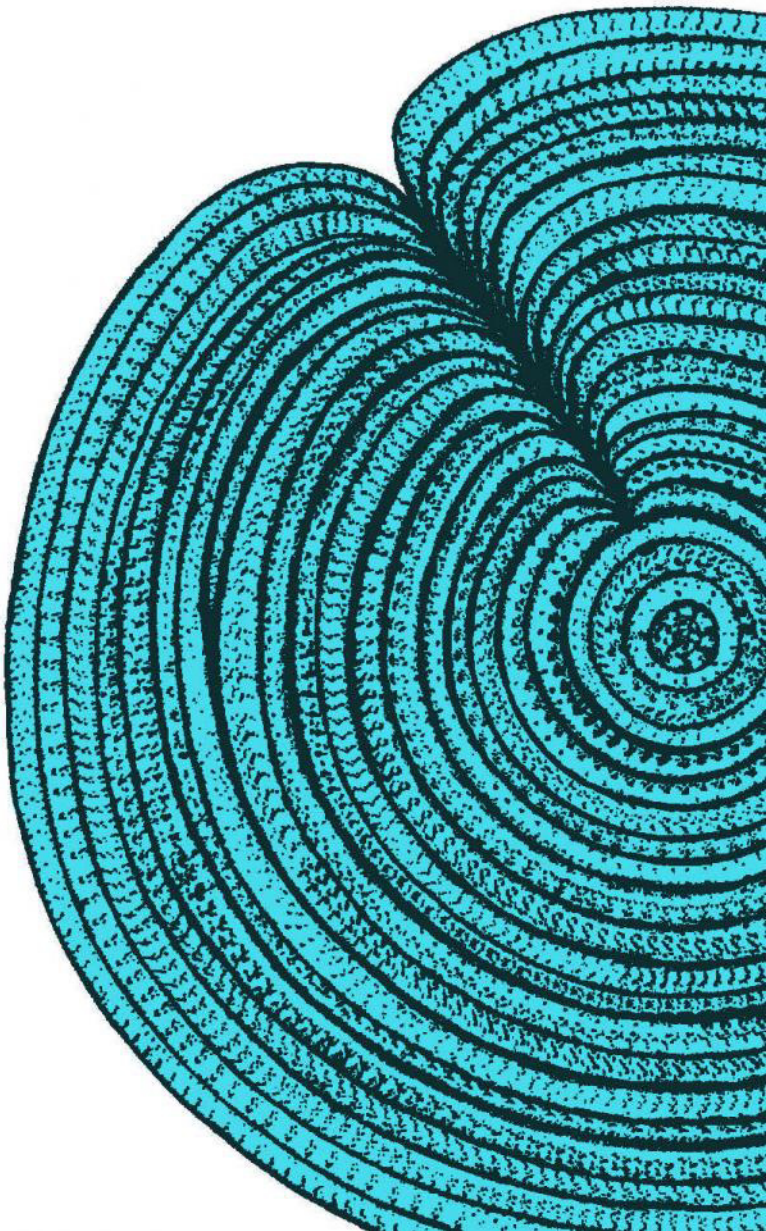

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edited by
Paolo Bernardis
Carlo Fantoni
Walter Gerbino

# Chicks run harder toward a consonant over a dissonant clucking hen:

# Biological roots for the appreciation of consonant sounds

Valerio Baiocchi, Cinzia Chiandetti

Psychology Unit "Gaetano Kanizsa", Department of Life Sciences, University of Trieste, Trieste, Italy

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Music is an ancient and pervasive human artistic product. With the aim of understanding whether some musical features present common biological roots, the issue of consonance over dissonance preference has been particularly debated [1-2]. Recently, a study investigating Amazonian populations showed that the less the exposure to Western music, the more the consonant and dissonant chords are rated as equally pleasant [3]. In this sense, our aesthetic response to consonance is the consequence of massive experience to cultural-specific musical rules. However, different BOLD responses in 3-day olds new-borns to consonant and dissonant music seem to indicate a predisposed differential sensitivity of the auditory cortex for the two kinds of sounds [4]. Alongside with this finding, comparative studies have shown that a baby chimp [5] and newly hatched domestic chicks [6], before any exposure to music, prefer the consonant versions with respect to the dissonant versions of the same melodies.

We further investigated chicks' spontaneous response to consonant and dissonant sounds by adopting a different paradigm and by preparing an *ad hoc* stimulation. Broody hens keep clucking while walking around to stimulate chicks' following behaviour; we simulated this situation in the laboratory by placing each chick in a running-wheel and an imprinting object 50cm apart. We then manipulated an adult hen's vocalization to have a consonant and a dissonant clucking (two clucks were overlapped to the original cluck: one at perfect fifth and one at an octave above for the consonant and one at major second and one triton for the dissonant) presented within the hen's rhythmical specie-specific pattern.

We tested 20 chicks immediately after hatching when they were exposed to any other sound but that of the incubator and scored their running activity in response to both the consonant and dissonant clucking presented in randomized order between animals. The results show that chicks ran significantly more while listening to consonant as compared to dissonant clucking ($p$=0.03). The results therefore show, with a novel paradigm, that chicks prefer consonance.

With this finding we add evidence to the idea that harmonics appreciation could be a valuable evolutionary mechanism to detect other living organisms [7-8].

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